MULTIMEDIA UNIVERSITY

STUDENT IDENTIFICATION NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

BBF3124 – FINANCIAL DERIVATIVES

(All sections / Groups)

24th October 2018
9:00 AM – 11:00 AM
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 5 pages with two (2) parts: PART A (3 Questions)
   PART B (2 Questions)
2. Answer ALL questions in PART A and any ONE (1) question in PART B.
3. The distribution of the marks for each question is given at the end of each question.
4. Please write all your answers in the Answer Booklet provided. Start each answer on a new page.

PART A – ANSWER ALL QUESTIONS

QUESTION 1

(a) Lists and discuss **THREE (3)** determinants of interest rate futures prices.

(6 marks)

(b) AGRO Bank has agreed to provide an important institutional client with a fixed rate 3-month RM 90 million loan 90 days from today. The Bank had priced the loan at 10% annual interest rate. Assuming the bank's cost of funds is the KLIBOR rate and the following quotes are now available:

3-month KLIBOR	:	7%
3-month KLIBOR futures	:	92.50

(i) Calculate the profit margin that you wish to lock-in.

(4 marks)

(ii) Outline the strategy to protect yourself from a rise in interest rate.

(3 marks)

(iii) Assuming interest rate rise by 2.5% over the next 3 months, show using computations that you would have locked-in the interest spread.

(12 marks)

(Total: 25 marks)

QUESTION 2

(a) Briefly explain the pricing equivalence of call and put options.

(5 marks)

(b) Show if there is any mispricing given the following information:

3-month RM20.00 Call options on *I*GOT Berhad stocks is selling at RM3.54
3-month RM20.00 Put options on *I*GOT Berhad stocks is selling at RM2.00
Currently, *I*GOT Berhad stocks are selling at RM22.00
Risk free interest rate is 12% per annum

(8 marks)

Continued...

(c) If there is a mispricing between call and put options above, show an arbitrage strategy and how a riskless arbitrage profit can be realized, assuming the stock price either goes up to RM30.00 or goes down to RM14.00 on the maturity date of the option. Support your answer with a payoff diagram.

(12 marks)

(Total: 25 marks)

QUESTION 3

(a) Spreading is less risky than taking an outright position. Comment on this statement.

(6 marks)

(b) Outline the appropriate hedge strategy using options for each of the following situations. (Assume calls and puts are available on the underlying asset.)

(i) A Malaysian importer anticipates making payment in British pounds in 3 months.

(3 marks)

(ii) A Malaysian bank has gone into a long position in a forward contract on Japanese Yen with its customer. It wants to hedge its exposure.

(3 marks)

(c) You think Telekom stock will fall over the next 3 months. Assuming options are available on Telekom stock, state **TWO** (2) strategies (using only options), that will let you benefit from a fall while limiting downside risk.

(4 marks)

(d) For each of the following situations, outline the appropriate strategy using futures and options.

(i) RHB Bank whose cost of funds is fixed has agreed to lend RM15 in 3 months at KLIBOR + 3%.

(3 marks)

(ii) Mr Raymond speculates the FBM KLCI is about to rise sharply over the next 6 months.

(3 marks)

Continued...

(iii) Ms Audrey finds that the 3-month SIF contract which should have a price of 1718 points is being quoted at 1706 points.

(3 marks)

(Total: 25 marks)

PART B – ANSWER ONE (1) QUESTION ONLY

QUESTION 1

(a) Mr Roberto is trying to value an option with 12 months to maturity. The underlying stock is currently trading at RM14.00 and expected to pay dividend of RM1.80 per share 5 months (150 days) from now.

(i) If the risk free rate is 8% per annum, calculate the present value of the dividend and the new input variable for stock price in the Black-Scholes Model?

(7 marks)

(ii) If such dividend reduces the price of the stock which is used as one of the inputs in Black-Scholes Model, what impact would such an adjustment has on the value of call and put options?

(8 marks)

(b) Briefly describe the "Vega" and state the nature of relationship with call and put prices.

(6 marks)

(c) Briefly explain the difference in risk taken by the buyer and the seller of an option.

(4 marks)

(Total: 25 marks)

Continued...

QUESTION 2

(a) Use the Black-Scholes Model formula (see equations below and cumulative normal distribution table) to find the value of a call option and a put option for the following stock:

Stock price	:	RM 40
Strike price	:	RM 40
Time to maturity	:	1 year
Risk-fee rate	:	9%
Standard deviation	:	0.30

$$CP = CMP[N(d_1)] - \frac{EP}{e^{rt}}[N(d_2)]$$

$$d_1 = \frac{\ln(CMP/EP) + (r + 0.5\sigma^2)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

(16 marks)

(b) Briefly explain **SIX (6)** assumptions made by the Black-Scholes Model that might make it, in practice, unrealistic.

(9 marks)

(Total: 25 marks)

Continued...

Table: Cumulative Normal Distribution

d	$N(d)$	d	$N(d)$	d	$N(d)$	d	$N(d)$	d	$N(d)$	d	$N(d)$
-3.00	.0013	-1.58	.0571	-0.76	.2236	0.06	.5239	0.86	.8051	1.66	.9515
-2.95	.0016	-1.56	.0594	-0.74	.2297	0.08	.5319	0.88	.8106	1.68	.9535
-2.90	.0019	-1.54	.0618	-0.72	.2358	0.10	.5398	0.90	.8159	1.70	.9554
-2.85	.0022	-1.52	.0643	-0.70	.2420	0.12	.5478	0.92	.8212	1.72	.9573
-2.80	.0026	-1.50	.0668	-0.68	.2483	0.14	.5557	0.94	.8264	1.74	.9591
-2.75	.0030	-1.48	.0694	-0.66	.2546	0.16	.5636	0.96	.8315	1.76	.9608
-2.70	.0035	-1.46	.0721	-0.64	.2611	0.18	.5714	0.98	.8365	1.78	.9625
-2.65	.0040	-1.44	.0749	-0.62	.2676	0.20	.5793	1.00	.8414	1.80	.9641
-2.60	.0047	-1.42	.0778	-0.60	.2743	0.22	.5871	1.02	.8461	1.82	.9656
-2.55	.0054	-1.40	.0808	-0.58	.2810	0.24	.5948	1.04	.8508	1.84	.9671
-2.50	.0062	-1.38	.0838	-0.56	.2877	0.26	.6026	1.06	.8554	1.86	.9686
-2.45	.0071	-1.36	.0869	-0.54	.2946	0.28	.6103	1.08	.8599	1.88	.9699
-2.40	.0082	-1.34	.0901	-0.52	.3015	0.30	.6179	1.10	.8643	1.90	.9713
-2.35	.0094	-1.32	.0934	-0.50	.3085	0.32	.6255	1.12	.8686	1.92	.9726
-2.30	.0107	-1.30	.0968	-0.48	.3156	0.34	.6331	1.14	.8729	1.94	.9738
-2.25	.0122	-1.28	.1003	-0.46	.3228	0.36	.6406	1.16	.8770	1.96	.9750
-2.20	.0139	-1.26	.1038	-0.44	.3300	0.38	.6480	1.18	.8810	1.98	.9761
-2.15	.0158	-1.24	.1075	-0.42	.3373	0.40	.6554	1.20	.8849	2.00	.9772
-2.10	.0179	-1.22	.1112	-0.40	.3446	0.42	.6628	1.22	.8888	2.05	.9798
-2.05	.0202	-1.20	.1151	-0.38	.3520	0.44	.6700	1.24	.8925	2.10	.9821
-2.00	.0228	-1.18	.1190	-0.36	.3594	0.46	.6773	1.26	.8962	2.15	.9842
-1.98	.0239	-1.16	.1230	-0.34	.3669	0.48	.6844	1.28	.8997	2.20	.9861
-1.96	.0250	-1.14	.1271	-0.32	.3745	0.50	.6915	1.30	.9032	2.25	.9878
-1.94	.0262	-1.12	.1314	-0.30	.3821	0.52	.6985	1.32	.9066	2.30	.9893
-1.92	.0274	-1.10	.1357	-0.28	.3897	0.54	.7054	1.34	.9099	2.35	.9906
-1.90	.0287	-1.08	.1401	-0.26	.3974	0.56	.7123	1.36	.9131	2.40	.9918
-1.88	.0301	-1.06	.1446	-0.24	.4052	0.58	.7191	1.38	.9162	2.45	.9929
-1.86	.0314	-1.04	.1492	-0.22	.4129	0.60	.7258	1.40	.9192	2.50	.9938
-1.84	.0329	-1.02	.1539	-0.20	.4207	0.62	.7324	1.42	.9222	2.55	.9946
-1.82	.0344	-1.00	.1587	-0.18	.4286	0.64	.7389	1.44	.9251	2.60	.9953
-1.80	.0359	-0.98	.1635	-0.16	.4365	0.66	.7454	1.46	.9279	2.65	.9960
-1.78	.0375	-0.96	.1685	-0.14	.4443	0.68	.7518	1.48	.9306	2.70	.9965
-1.76	.0392	-0.94	.1736	-0.12	.4523	0.70	.7580	1.50	.9332	2.75	.9970
-1.74	.0409	-0.92	.1788	-0.10	.4602	0.72	.7642	1.52	.9357	2.80	.9974
-1.72	.0427	-0.90	.1841	-0.08	.4681	0.74	.7704	1.54	.9382	2.85	.9978
-1.70	.0446	-0.88	.1894	-0.06	.4761	0.76	.7764	1.56	.9406	2.90	.9981
-1.68	.0465	-0.86	.1949	-0.04	.4841	0.78	.7823	1.58	.9429	2.95	.9984
-1.66	.0485	-0.84	.2005	-0.02	.4920	0.80	.7882	1.60	.9452	3.00	.9986
-1.64	.0505	-0.82	.2061	0.00	.5000	0.82	.7939	1.62	.9474	3.05	.9989
-1.62	.0526	-0.80	.2119	0.02	.5080	0.84	.7996	1.64	.9495		
-1.60	.0548	-0.78	.2177	0.04	.5160						

This table shows the probability [$N(d)$] of observing a value less than or equal to d. For example, as illustrated, if d is -.24, then $N(d)$ is .4052.

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